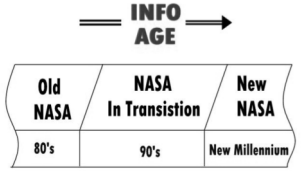
NASA FBC TASK



Industry Perspective for FBC *continued...*

- NASA emphasis is on Faster and Cheaper, Better is arguable:
  - ✓ NASA should focus on Better, recognizing that faster developments and lower life-cycle costs will invariably result
  - ✓ …and we can measure better!
  - ✓ Remember: price and value are not the same
- Current RFP practices promotes risky competition, not mission success:
  - ✓ Contrary to the spirit of FBC
  - ✓ Ensure that procurements establish clear and complete evaluation criteria and scope:
    - A fair and common basis on how contractor will be judged
    - All factors that ensure mission success, including reviews, testing, etc.
  - ✓ Improve communications between NASA and industry on RFPs:
    - Additional bidders conferences to ensure that requirements and scope are clearly understood
  - ✓ Only way of getting realistic, comparable costs.

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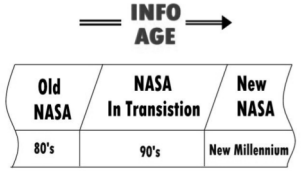

Industry Perspective for FBC *continued...*

- Reform approach to risky procurements:
  - ✓ Recognize that fixed price contracts on one-of-a-kind s/c costs more
  - ✓ GFE technology elements on fixed-price contracts
  - ✓ Cost-plus on first item or one-of-a-kind spacecraft
- Exploit opportunities for spacecraft series (Explorer, Surveyor, etc.):
  - ✓ This will assist with team continuity.
  - ✓ And permit common buys.
- Fund more pre-Phase A /Phase A initiatives
- Publish a more detailed 5-year plan with budget-follow the Air Force's Program Objective Memorandum (POM) model.
- Stop wasting resources through Program false starts:
  - ✓ NASA overuses the RFI process
  - ✓ Industry views this as theft of intellectual property
  - ✓ RFPs only w/budget – 95% probability of release.
  - ✓ Let contractor set CDRL, review, and test requirements

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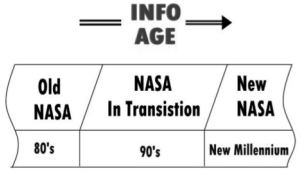

Industry Perspective for FBC *continued...*

- Be realistic right-up front:
  - ✓ Quantify requirements up-front and tell the contractor quantitatively what NASA is willing to accept in the way of risk
  - ✓ Establish risk reserves at the Program level (e.g., Discovery Program level)
  - ✓ Strengthen test & integration budgets
  - ✓ If industry is being asked to carry some of the risk, provide a potential for higher profit
- Support and be flexible with private sector parts selection:
  - ✓ Retain NASA excellence in the monitoring and availability of EEE parts, materials, and processes
- Perform an Improved “lessons learned” practice:
  - ✓ Make sure that contractors can fully access existing NASA systems
  - ✓ Generate and maintain a living database
  - ✓ Prepare mission case studies to help educate engineering students

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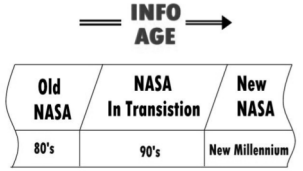
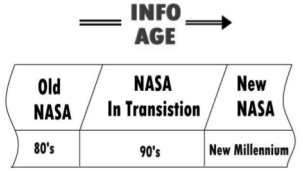


Industry Perspective for FBC *continued...*

- NASA maintains unrealistic expectations:
  - ✓ NASA wants “Class A” performance with “Class C” cost
  - ✓ The strategy “take risk – don’t fail” doesn’t work!
- Current Design and Implementation Reviews are inadequate and must be made more effective:
  - ✓ Structure reviews to aid projects and not protect NASA
  - ✓ Reduce oversight costs and trade for more reserves to support Technical Reviews
  - ✓ Add $ for adequate External Peer Reviews
  - ✓ Ensure that RFP evaluation criteria promote adequate Reviews
  - ✓ Make senior NASA technical staff available to support Design/Ops Review Process
- People are the KEY to the success of the space program
- Ensure that FBC is not built upon a false economy:
  - ✓ Burnout is a serious threat on many teams; it’s a theme echoed throughout industry, academia, and government
  - ✓ Continuous workloads are well in excess of what’s reasonable
  - ✓ Essentially violates FBC rules because it costs more in the long-run:
    - Promotes an error-prone environment
    - Heroic efforts cannot be repeated
    - Loss of more competent people that depart for other industries
    - Increases risk through loss of continuity.
  - ✓ NASA should partner with industry to sponsor joint government/industry program management training

NASA FBC TASK

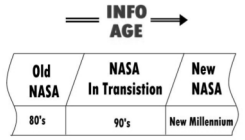


In closing, the following provides Major Obstacles, Top 10 Challenges, Recommendations, Final Observations

Major Obstacles to FBC

- Attempting to do too much, too soon - some cuts are too deep
- Open core competency issues
- Shifting out of basic research
- Lack of an Integrated Technology Plan, including IT
- Depletion of talent
- Facing into necessary culture changes- achieving interdependency and trust at multiple levels

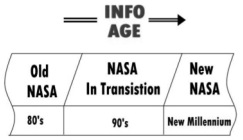
NASA FBC TASK



TOP 10 NASA CHALLENGES

- This Top 10 NASA Challenges chart is meant to maintain perspective. This type of chart needs to be updated, understood, and maintained collectively by all involved with NASA. Each challenge should be address in a NASA action plan.
  - ✓ Clearly the Space Station must be perceived as top priority within NASA
  - ✓ With so much payoff at stake, reduction of launch vehicle cost must be a larger national priority.

NASA FBC TASK



TOP 10 NASA CHALLENGES

- Complete Space Station safely
- Reduce mission failure rate
- Acquire, maintain, motivate good people
- Regain launch vehicle leadership – reduce cost by 1/10 or more
- Reshape NASA Enterprises/Centers for 21st century – core competency – Centers of Excellence
- Transition from largely an Operations Agency to a Research and Development Agency
- Make advanced technology development a higher priority, implement a more effective Integrated Technology Plan
- Align Enterprises and Centers to implement an Integrated Information Technology Thrust-combining IS, ISE, CoSMO other IT related activities into one Program
- Affect better industry and academia partnership
- Outreach to public more effectively, engage them, involve them, get them to understand both the risk and the major payoff potential for NASA

NASA FBC TASK

Recommendations

- Place higher priority on people acquisition, motivation, training
  - ✓ Develop incentives for attracting good people and well-respected leaders to come to work for NASA
  - ✓ Expand the role and clout of NASA 's Academy of Program and Project Leadership
  - ✓ Certify Project Managers, and Teams as to experience and expertise - **Badge of Courage #1**
  - ✓ Continue symposiums on lessons learned, re-engineering, information technology cultural change, teaming, etc. bringing in experts from within/outside NASA
  - ✓ Acquire outside help on cultural change and organizational issues

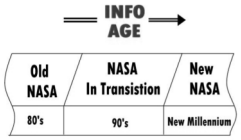
- Assign responsible to Office of Chief Engineer for: Consolidating the findings of this report with the Mars Program and MCO Investigation Reports deriving composite FBC Project Lessons Learned, FBC Rules of Engagement and Project Implementation check lists

- Assign responsibility to NASA Academy of Program and Project Leadership for:
  - ✓ Generating training material based on the consolidated material for FBC Training workshops for FBC Project Team Leaders and Teams which is first subjected to a "dry run" in front of experienced FBC Project managers from each Center, industry and academia
  - ✓ Conducting these FBC Training Workshops throughout NASA, industry, academia

4. Take aggressive steps to effect better teaming among NASA Centers, industry, academia
   - ✓ Start with strengthening NASA HQ Management, teaming among Enterprises, establishing better NASA HQ relationships with Centers
   - ✓ Form a NASA Center Office at HQ to bring NASA into the 21st Century – **Assign a NASA Center Champion**
     - To solve Center's core competency problem and to establish better industry and university partnerships
   - ✓ Resolve Center Core Competency and Center of Excellence Role Issues and Operations
   - ✓ Place higher priority on funding university research and advanced development and their Space Flight Missions
   - ✓ Assign the HQ Safety and Mission Assurance Office the responsibility for an Industry/Academia Workshop to effect better NASA Teaming arrangement – including contracting and incentives
   - ✓ Assign JPL the responsibility of forming and conducting a NASA-Wide Methods Working Group to share and evolve re- engineering products

5. Place higher priority on Advanced Technology Development - **Assign a Technology Champion**
   - ✓ Form a Technology Office led by a results-oriented CTO – must have as much stature/clout as Missions
   - ✓ Balance Research and Advanced Technology Development with focused Technology Development
   - ✓ Balance Competition of Technology Development with placing stable Technology Development at NASA Centers of Excellence.

NASA FBC TASK



Recommendations – *Continued*

6. Move out more aggressively on Information Technology Development – the most important HQ and Center-to-Center Teaming arrangement

Assign an Info Champion

- ✓ Form an Information Technology Program encompassing Integrated Synthesis Environment, Information Technology, Intelligent Systems, Consolidated Super Computing Management Office into one
- ✓ Place Program Leadership at HQ

7. Strike better balance between FBC Challenge and Risk
   - ✓ Initiate Program reality checks
   - ✓ Implement FBC Rules of Engagement and the associated performance metric - **Badge of Courage #2**
   - ✓ Ensure Project Teams "own" their Project Plans built from the "ground up"
   - ✓ Develop Programmatic and Mission Risk Signatures for each Project - **Badge of Courage #3**
   - ✓ Expand Safety and Mission Assurance responsibilities at NASA HQ and at the Centers for verifying:
     - Team Certification
     - Risk Signature
     - FBC Performance Metric
     - Project Readiness for Start, Launch Flight OPS
     - Compliance to FBC Lessons Learned
   - ✓ Give immediate relief to understaffed Mars OPS and Launch Services/OPS

8. Strike a better balance between Empowerment and Checks/Balances
   - ✓ Consolidate all Independent Review objectives into one Independent Review per year for all Programs and Projects
   - ✓ Continually evaluate the effectiveness of NASA policies, rules, procedures, etc. – like being accomplished for NASA 7120.5

Bring in outsiders to review NASA's approaches

AJS
March 2000
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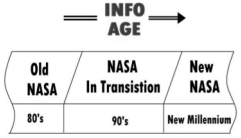
NASA FBC TASK



Final Observations

- FBC is here to stay. It's a National imperative. Let's get with it to make it work
  - ✓ NASA and FBC equate to the same thing
- Lots of work remains in transitioning to the new NASA, especially in bringing in more leaders
- This will take extraordinary teaming among NASA HQ, Centers, industry, academia
- Communications and teaming are at the core of every matter
  - ✓ Breakdowns in communication and teaming are behind most failures
  - ✓ Good communication and teaming are 99% the reason for successes
- Mission failure rate is too high – must be reduced
  - ✓ Mainly a result of mis-management and mis-engineering, not a result of new technology
  - ✓ Trying to do too much for too less
  - ✓ With great visions and roadmaps, we now need to focus more on the somewhat mundane implementation details
- For 1st GEN of FBC Robotic Deep Space Missions, scope fit reasonably well within the cost cap. For 2nd generation of missions cost caps were made much more severe for many of these Missions
- In addition for many of the 2nd generation of missions, there is more technical challenge. Consider, for example: Deep Space -1, 2, 3, 4; Mars Sample Return, Europa, SIM, X-series launch vehicles, next generation Telescopes
- Need a balance between Leadership at NASA HQ and with the Centers
  - ✓ Leadership at NASA HQ must be stronger, in particular, for solving the core competency problem, Center teaming, and forming an effective Advanced Technology Development Program
    - NASA leadership at HQ must be done in a new way, with a new spirit, with a results-oriented, can-do, outgoing highly communicative approach, more sensitive to," in tune with" center needs, supportive of center core competency responsibilities, bridging the relationship gap that exists and affecting closer teaming arrangements
  - ✓ Strike a better balance between Program Management at HQ and Centers
- **Key leaders need to be assigned ASAP to solve NASA's long standing problems**

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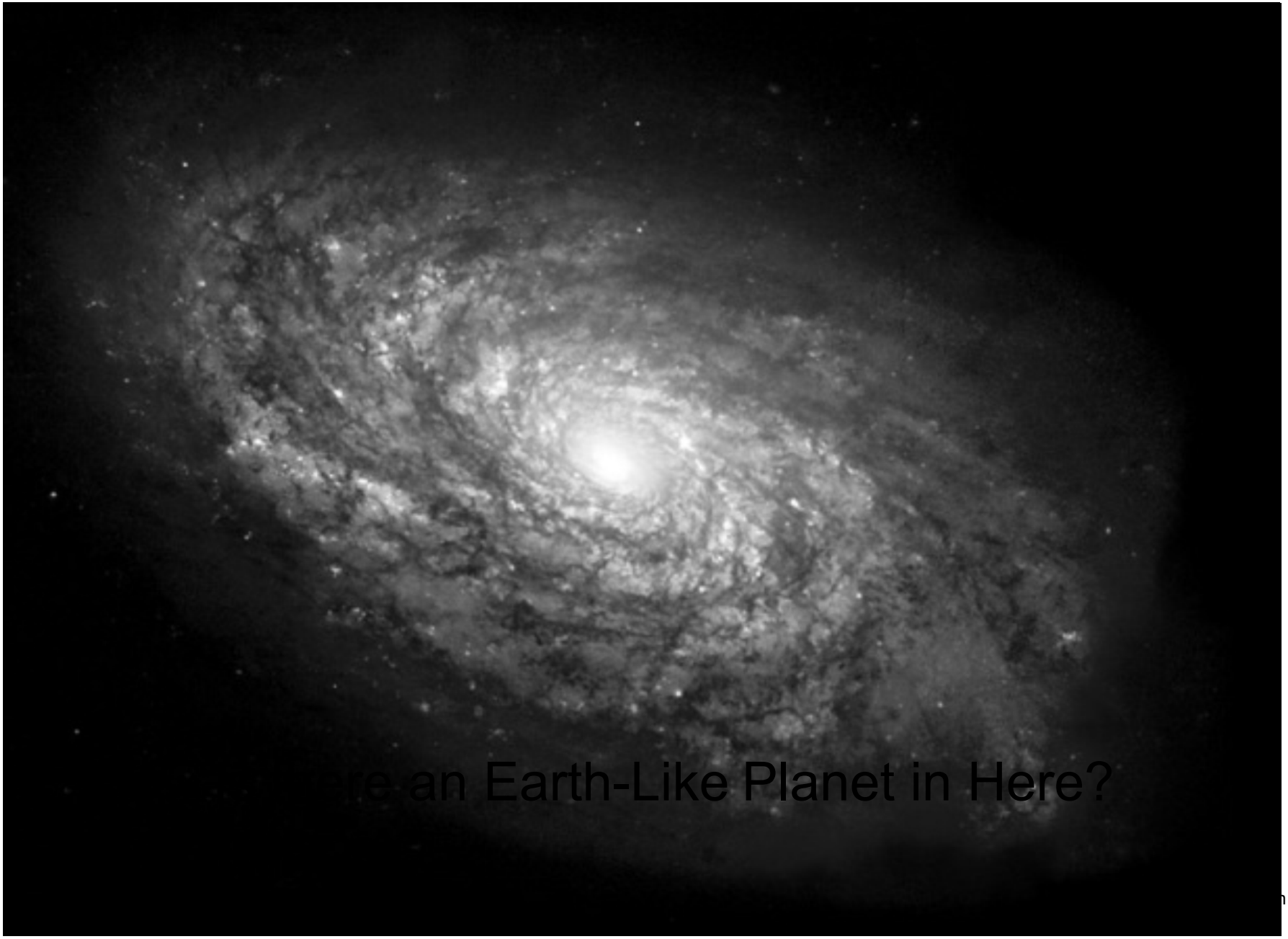
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